Remarks

By this amendment, claim 1 is revised and claim 12 is added to place this application in immediate condition for allowance. Currently, claims 1-3 and 12 are before the Examiner for consideration on their merits.

In the rejection, all claims stand rejected under 35 U.S.C. § 102(b) based on either United States Published Patent Application No. 2003/0121864 to Sun or WO 02/062509 to Daimon et al. (Daimon). In making this rejection, the Examiner is interpreting claim 1 to read on an Fe-Pt alloy and the recited sizes. For the stated properties and volume percent, the Examiner takes the position that since the powders of the prior art appear to be the same in terms of composition and structure, the claimed properties would be present in the prior art powders.

Applicant traverse the rejection on the grounds that the claimed powder is made in a different fashion that the prior art and thus the powder does not share the same product characteristics as now claimed. That is, claim 1 is revised to further define the fluid nature of the powder and clarify that the free flowing powder has the uniaxial crystal magnetic anisotropy without heat treatment, the anisotropy characteristic of an fct structure. Claim 12 is added to further define the fluid nature of the powder in terms of applying a magnetic field.

First, support for the claim 1 amendment may be found on page 4, lines 1-6 of the specification. Therein, it is stated:

> On the other hand, if the particles should have uniaxial crystal magnetic anisotropy from the start and should further be in the state of a powder enabling the particle to flow freely, it would be easily possible to disperse the particles in resin and uniaxially align them with respect to a substrate at

normal temperature by applying a conventional technology used for drying a coating-type magnetic recording medium.

What this phrase means is that if the particles are free flowing and have a uniaxial crystal magnetic anisotropy **without or before** heat treatment, the particles can rotate freely in the magnetic flux direction of an outer magnetic field when they are in the magnetic field.

Support from claim 12 can be gleaned from the description beginning on page 3, line 21 to page 4, line 5. Here, it is implicit that since the particles are fluid and not stuck to a substrate as are the prior art powders, the particles would be free to rotate when positioned in and subjected to a magnetic field.

The fluidity of the inventive particles can be traced to the novel way in which the particles are made so as to have an fct structure. As noted above, an important feature of the inventive particles is the ability to rotate freely in the magnetic flux direction of an outer magnetic field when they are in the magnetic field, because the particles have not undergone a heat treatment that would result in a fixation of positions of the particles on a substrate. The fluid particles have the uniaxial magnetic crystal anisotropy due to their fct phase.

The unique features of the inventive particles can be traced to the method of making, which is not found in the cited prior art. Referring to the paragraphs discussed in the Background Section of the application, fct particles are produced by first synthesizing a disordered fcc structure and then heat treating this disordered structure

to form an ordered fct structure so that the particles are useful in ferromagnetic applications.

The heat treatment used to produce the fct structure is problematic in that it tends to cause the particles to aggregate and they are not in a nanoparticle morphology useful for high density recording medium, see paragraph [0010] of Applicant's published application. Besides being unfit for high density recording medium applications, these aggregated particles cannot read on the claimed powder since the aggregation would cause the particles to be outside the size limitations of claim 1.

To overcome this problem of particle enlargement, the prior art proposes to heat treat the fcc particles by first fixing the particles on a substrate, see paragraph [0011] of the published application. While this approach solves the problem of the aggregation of the particles, it creates another problem in that the particles are adhered to the substrate and it is difficult to rearrange the powders on another substrate or base. While fct particles produced by this technique assume uniaxial crystal magnetic anisotropy during the heat treatment, they still are not acceptable due to the difficulty in rearranging the particles as explained above.

The present invention solves this problem by producing an fct particle that is free flowing and has a uniaxial crystal magnetic anisotropy (which is found in the heat treated prior art particles), but has these properties without the need for heat treatment. Therefore, a particle having all of the benefits of an fct phase is available and with the fluidity needed for use in nanoparticle applications.

The powder now defines in claim 1 is not disclosed in either of Sun or Daimon since these references are representative of the prior art method of producing particles with fct phase using a heat treatment, and these particles are not both free flowing and having uniaxial crystal magnetic anisotropy. The differences between each of Sun and Daimon and claim 1 are addressed in more detail below under their respective headings.

SUN

Sun discloses FePt particles having an fct structure produced by a heat treating step and particles having an fcc structure using the polyol process. More particularly, Sun, in paragraph [0023], teaches that thermal annealing is applied to convert the internal particle structure from a chemically disordered fcc to a chemically ordered fct phase. In paragraph [0034], thermal annealing at 580 °C for 30 minutes under N_2 was carried out to get an X-ray diffraction pattern of the fct phase. In paragraph [0035], annealing between 500 °C and 600 °C gives a mirror-thin film with controlled room temperature coercivity up to 15,000 Oe, and that the synthesized alloy has a disordered fcc structure which transforms into an ordered fct structure after annealing.

It is apparent from the teachings of Sun that what has transformed into the ordered fct structure by the annealing has no particle state before annealing; cannot be considered to be a free flowing powder. Paragraph [0025] describes the fcc structure as a smooth particle thin film that is then converted to an ordered fct structure. This

structure, even if having uniaxial crystal magnetic anisotropy, cannot be considered to be a powder having free flowing fluidity as is required by claim 1.

While Sun may teach particles of FePt with an fct structure and a size of less than 10 nm, the powder does not have fluidity as required by claim 1. The reason for this is that Sun must heat treat the fcc structured particles to convert them to the fct structured particles and the thus-formed fct structure is a film, which does not have the claimed fluidity. Therefore, the Examiner does not have a basis to maintain the rejection based on 35 U.S.C. § 102(b) and it must be withdrawn.

Moreover, there is no basis from which to assert that the fluid powder of claim 1 is somehow obvious over the teachings of Sun. There is no teaching in Sun as to how to synthesize an ordered fct structure without requiring an annealing step and no hint of practicing a method that could be considered the same as the method of the invention, which briefly comprises reducing a metal salt with a polyalcohol or polyalcohol derivative having a boiling point of 270 °C or higher and then proceeding with a reduction at a temperature of 270 °C or higher. To make such an assertion would be the hindsight reconstruction of the prior art in light of the Applicant's invention and such a rejection could not be sustained on appeal.

<u>DAIMON</u>

Daimon is similar to Sun in teaching the annealing of a precursor product to produce the order fct structure. More particularly, Daimon describes an essential step of heating the product powder (FePt particles) having an fcc structure at a temperature

of 550-650 °C (for the composition of general formula 1) or 300-500 °C (for the general composition formula 2) in order to transform the powder to an fct structure, see col. 4, lines 25-28 and lines 46-49, as well as claim 2.

Daimon's desire is to provide a novel method for synthesizing monodisperse metal alloy fine particles having a uniform particle size that constitutes the "basis" of the CuAu-I type $L1_0$ ordered phase, see col. 3, lines 50-53. It is apparent that the "basis" of the CuAu-I type $L1_0$ ordered phase (in other words a chemical ordered fcc phase) means a precursor that can be transformed into an fct structure by the heat treatment noted above. Therefore and to the extent that the powder disclosed in col. 5, lines 8-23 is the precursor to the CuAu-I type $L1_0$ ordered phase, this precursor powder cannot be the same as that claimed, since claim 1 requires a powder with an fct structure and the property of uniaxial crystal magnetic anisotropy. Consequently, the precursor of Daimon cannot be said to anticipate claim 1 and the rejection cannot stand as presently formulated.

Daimon's true invention is the manner in which the precursor or fcc particles are made and it is these fcc phase particles that are then heat treated to form the fct structure. Therefore, the question of patentability regarding Daimon and claim 1 is whether the fct structure particles of Daimon that are derived from heat treating the synthesized precursor particles can be said to be either the same as that claimed or some obvious variation to support a rejection under 35 U.S.C. § 103(a).

Since Daimon specifically discloses that the particles with fcc structure are heat treated at temperatures of 550-650 °C or 300-500 °C, it is fair to say that with such

heat treatments, the fine nanoparticles would stick to their supporting substrate and not have the claimed fluidity. This position is backed up with the prior art discussion of the instant application addressed above. That is, paragraphs [0007] and [0012] each addresses annealing affects in the temperature ranges disclosed in Daimon. From this, one of skill in the art would assume that the same problems attributable to the prior art discussed in these paragraphs would be present in the heat treated powder of Daimon, and a fluid powder as claimed would not be present.

It is also argued that Daimon's process is not the same as Applicant's so that there is no basis to contend that Daimon produces the claimed powder. In the examples of Daimon, ethyleneglycol is used as a solvent for metal salts and a reducing agent, and a reflux temperature of 197 °C is employed. These are not the conditions used in the inventive method to make the claimed fct structure powder without heat treatment. The boiling point of ethylenegylcol is 197 °C, and therefore the inventive method step of reducing the metal salt with an alcohol or polyalcohol with a boiling temperature of 270 °C or higher cannot be met. Also, the 197 °C reflux temperature of Daimon is lower than that used in the invention. Therefore, it cannot be said that a magnet powder having an fct structure as synthesized and without heat treatment is taught by Daimon.

There is also no basis to make a rejection based on 35 U.S.C. § 103(a) using Daimon. Daimon specifically teaches employing a heat treatment to produce the fct structure, and as explained above, powders made using this technique cannot be said have the free flowing fluidity of the powder of claim 1.

While Daimon in col. 10, lines 59-67, teaches that a magnetic insulation can exist, it is submitted that this disclosure is insufficient to support a contention that the particles of Daimon have the claimed fluidity. First, col. 8, lines 23-38, describe the organic protective agent in the context of the synthesis process, which, as pointed out above, refers to the synthesis of the powders of general formula 1 or 2 to produce a disordered fcc structure. However, the fluidity of the fcc structured powders is not the issue here. Instead, it is whether Daimon can be said to teach the claimed powder in terms of its composition and fct characteristics, and notably the claimed fluidity.

Daimon does seem to imply that the magnetic insulation caused by the organic protective agent is present even after heat treating. However, there is no working example showing a heat treatment and the formation of such insulating material derived from the organic protective agent. In addition, the disclosure immediately following the col. 10 disclosure, i.e., col. 11, lines 1-25, describes a method wherein the synthesized fcc particles are applied to a substrate for heat treating. This is the very method taught in paragraph [0012] of the published application. While the organic protective agent may prevent sintering of the particles that are placed on the substrate and heat treated, these particles do not have fluidity since they are adhered to the substrate.

In light of the above, it is submitted that Daimon neither anticipates nor renders obvious claim 1 and the rejection using this reference must be withdrawn.

CLAIM 12

Claim 12 is believed to be patentable for the same reasons as claim 1. That is, neither Sun nor Daimon teaches the claimed powder having a free flowing fluidity and being able to rotate when positioned in a subjected to a magnetic field. The powders of the prior art that are heat treated all suffer from the same lack of fluidity, either because the particles agglomerate as described in paragraph [0010] of the application or are adhered to a substrate as part of the transformation to the fct structure, and thus cannot rotate as claimed. Thus, claim 12 is separately patentable over Sun and Daimon.

SUMMARY

By the changes to the claims and arguments above, it is submitted that neither Sun nor Daimon teaches the claimed powder and its fluidity and a *prima facie* case of anticipation cannot be made against claims 1 and 12. Further, there is no basis to contend obviousness without resort to Applicant's own teachings and this would be tantamount to hindsight.

Accordingly, the Examiner is requested to examine this application and pass claims 1-3 and 12 onto issuance.

If the Examiner believes that an interview would be helpful in expediting the allowance of this application, the Examiner is requested to telephone the undersigned at 202-835-1753.

Again, reconsideration and allowance of this application is respectfully requested.

The above constitutes a complete response to all issues raised in the Office Action dated September 20, 2007.

A petition for a one month extension of time is hereby made. Payment of the petition fee of $120 is submitted in the form of a check.

Please charge any fee deficiency or credit any overpayment to Deposit Account No. 50-1088.

Respectfully submitted,
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